shown in FIGS. **11-13**, the preferred burner end **16** of the preferred burner assembly **10** includes the preferred converging focusing cone **40**, the preferred diverging conical discharge section **44** and the preferred spin vane **56**. As shown in FIGS. **11-12**, the preferred converging focusing cone **40** is located upstream of the preferred spin vane **56**, and the preferred diverging conical discharge section **44** includes at least one expansion and contraction crease **45** adapted to permit the conical discharge section to expand and contract with temperature variations. As shown in FIG. **12**, the preferred diverging conical discharge section **44** has an included angle of approximately 55°.

[0056] Referring now to FIG. **17**, a front view of a first alternative embodiment of the burner assembly in accordance with the present invention is illustrated. As shown in FIG. **17**, the first alternative embodiment of the burner assembly is designated generally by reference numeral **110**. The preferred burner assembly **110** is built on skid assembly SA**1** having lifting tubes LE**1** that allow the assembly to be handled with a fork truck or hoist. The preferred burner assembly **110** is adapted to selectively fire on a gaseous fuel such as natural gas or a liquid fuel such as fuel oil, or both. The preferred burner assembly **110** comprises housing **112** having burner end **116**. The preferred burner assembly **110** also includes transition section **128**, gas injection section **130**, pre-mix cone **134** and seal skirt **135**.

[0057] Still referring to FIG. **17**, the preferred burner assembly **110** further includes isolation shroud **138** at the burner end. The preferred isolation shroud **138** is adapted to surround (see FIG. **18**) and partially enclose the burner nose, i.e., the components of the burner assembly nearest to the burner flame such as the converging focusing cone **140**, the diverging conical discharge section **144** and the downstream end of premix cone **134**. See FIGS. **19-20**A. The preferred isolation shroud **138** is also adapted to be purged with ambient air under positive pressure. As a result, the preferred isolation shroud **138** is adapted to reduce the temperature of the burner assembly components at the burner end, including converging focusing cone **140** and diverging conical discharge section **144**. In addition, the preferred isolation shroud is adapted to isolate the burner nose from debris produced in the combustion chamber.

[0058] While FIG. **17** illustrates the preferred configuration and arrangement of the isolation shroud, it is contemplated within the scope of the invention that the isolation shroud may be of any suitable configuration and/or arrangement. More particularly, it is contemplated within the scope of the invention that the isolation shroud may surround and partially enclose more, fewer or different components than the converging focusing cone, the diverging conical discharge section and the downstream end of the premix cone. It is also contemplated within the scope of the invention that the isolation shroud may not entirely surround the burner nose, and that it may entirely enclose the burner nose. It is further contemplated within the scope of the invention that the isolation shroud may be purged with fluids other than ambient air, and that such fluids may be conveyed to the isolation shroud by any suitable means.

[0059] Referring now to FIG. **19**, a sectional front view of the preferred burner assembly **110** is illustrated. As shown in FIG. **19**, the preferred burner assembly **110** includes pre-mix gas injection nozzles **136**, converging focusing cone **140** and diverging conical discharge section **144**. In the preferred embodiments, burner assembly **110** includes at least one suspension spoke **148** extending from the burner nose to isolation shroud **138**. The preferred suspension spoke **148** is adapted to be removably attached to isolation shroud **138** and provide structural support to the burner nose. As shown in FIG. **19**, the preferred burner assembly **110** also includes atomizing nozzle **150** and spin vane **156** which are mounted at the burner end. The preferred burner assembly **110** further includes straightening screen **157**, mixing screen **158**, and liquid fuel system **160** comprising primary air tube **162**, liquid fuel supply tube **166** and compressed atomizing air supply tube **168**.

[0060] Referring now to FIGS. **20** and **20**A, a partial sectional front view of the preferred burner nose of burner assembly **110** is illustrated. As shown in FIGS. **20** and **20**A, the preferred isolation shroud **138** is removably attached to diverging conical discharge section **144** by suspension spokes **148**. While the preferred suspension spokes **148** include a threaded fastener, it is contemplated within the scope of the invention that the suspension spokes may be any suitable device, mechanism, assembly or combination thereof adapted to attach the isolation shroud to the burner nose. It is also contemplated within the scope of the invention that there may be more or fewer than two suspension spokes and that the suspension spoke(s) may be arranged in any suitable manner. It is further contemplated within the scope of the invention that the isolation shroud may be an integral part of the burner assembly. As shown in FIG. **20**, the preferred burner assembly **110** further includes ring **170** (see also FIG. **18**). While the preferred ring **170** is a smooth ring, it is contemplated within the scope of the invention that the ring may be of any suitable configuration including, without limitation, a castellated ring, a slotted ring, a flapped ring and the like.

[0061] In operation, the several advantages of the burner assembly of the invention are achieved. For example, the preferred burner assembly is capable of selectively firing on gaseous fuel, liquid fuel, or both gaseous and liquid fuel. The preferred burner assembly is capable of firing on gaseous and/or liquid fuels without physically altering the components of the apparatus, changing the firing rate of the apparatus, or shutting down the apparatus. The preferred burner assembly is adapted to fire on oil or liquid propane without changing the atomizing nozzle. The preferred burner assembly is capable of supplying natural gas or propane to the atomizing nozzle for use as pilot fuel.

[0062] In addition, the preferred burner assembly produces a short, narrow and stable main flame configuration. The improved main flame configuration reduces the amount of combustion space required to heat and dry aggregate materials for the production of hot mix asphalt. The improved main flame configuration is adapted for use on a wide variety of different-sized combustion chambers having different-sized combustion spaces.

[0063] Further, the spacing and configuration of the spin vane, the ring, and the pre-mix gas injection nozzles in the preferred embodiment of the invention results in a more complete and uniform mixture of combustion air, gaseous fuel and/or liquid fuel. The spin vane may be fixed because adjustment of the flame configuration is not required, even when using the burner assembly with a variety of different-sized dryer drums. As a result, costly and complicated adjustable spin vanes may be eliminated. In addition, the converging focusing cone section reduces the temperature of the dryer drum breech plate.